

What is claimed is:

1. A fault-testing node for a connectionless data link comprising:
  - 5           at least two opposing communication ports;
  - a soft switch for controlling port-to-port data flow through the device;
  - and
  - an instance of software for modifying header information associated with data units;
  - 10          wherein one or more port-to-port data flow paths are switched by activating the soft switch to loop incoming data units back to the sender of the data units through the device, and wherein the instance of software reverses the order of source and destination addresses of data units to insure acceptance of looped data units at the sender station.
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2. The node of claim 1 wherein the connectionless data link is an Ethernet data link, the data units are Ethernet frames, and the source and destination addresses are MAC addresses.
- 20   3. The node of claim 1 wherein the connectionless data link is an IP data link, the data units are IP data packets, and the source and destination addresses are IP addresses.
- 25   4. The node of claim 1 wherein the instance of software modifies the data unit header fields by copying the data from the first field to memory, copying the data from the second field and pasting the data into the first field, and then pasting the data from the memory into the second field.

5. The node of claim 1 having two operating modes, a loop-back mode and a pass-through mode.
- 5      6. The node of claim 1 further comprising an array of resident fault testing applications and a logging component to create activity and error logs during testing and during normal operation.
- 10      7. The node of claim 1 wherein loop-back tests performed include one or a combination of tests returning data for number of bytes sent or received over the link for a specified period, number of packets sent or received over the link for a specified period; number of CRC errors occurring over a specified period, average packet length of packets sent or received over the link during a specified period, average transmission rate over the link, address identification of the link, and protocol types in operation over the link.
- 15      8. The node of claim 1 wherein intrusive tests are performed including Bit-Error-Rate-Testing, testing for throughput between the node and another on-line device, testing for packet delay between any two points on the link, testing for jitter between any two point on the link, and testing for packet loss between any two points on the link.
- 20      9. In a fault-testing node for a connectionless data link, the node having at least two opposing communication ports and an instance of software for modifying data unit header information, a method for switching data sets resident in address fields of a data unit enabling loop-back of data units received at the node to the sender of the data units comprising steps of:
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- (a) copying the data set from a first field to a memory;
- (b) copying the data set from a second field;
- (c) pasting the data set from the second field into the first field; and
- (d) pasting the data set copied to memory in step (a) into the second

5 field.

10. The method of claim 9 wherein in step (a) the first field is a source address field the data set a source IP address of an IP data packet.

10 11. The method of claim 10 wherein in steps (b) and (c) the second field is a destination address field the data set a destination IP address, which becomes a source IP address when pasted into the source field of the IP data packet.

12. The method of claim 11 wherein in step (d) the data set is a source address, 15 which becomes a destination IP address when pasted into the destination field of the IP data packet.

13. The method of claim 9 wherein in step (a) the first field is a destination address field the data set a destination IP address of an IP data packet.

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14. The method of claim 13 wherein in steps (b) and (c) the second field is a source address field the data set a source IP address, which becomes a destination IP address when pasted into the destination field of the IP data packet.

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15. The method of claim 14 wherein in step (d) the data set is a destination IP address, which becomes a source IP address when pasted into the source field of the IP data packet.

5      16. The method of claim 9 wherein in step (a) the first field is a source address field the data set a source machine access code address of an Ethernet data frame.

10      17. The method of claim 16 wherein in steps (b) and (c) the second field is a destination address field the data set a destination machine access code address, which becomes a source machine access code address when pasted into the source field of the Ethernet data frame.

15      18. The method of claim 17 wherein in step (d) the data set is a source address, which becomes a destination machine access code address when pasted into the destination field of the Ethernet data frame.

20      19. The method of claim 9 wherein in step (a) the first field is a destination address field the data set a destination machine access code address of an Ethernet data frame.

25      20. The method of claim 19 wherein in steps (b) and (c) the second field is a source address field the data set a source machine access code address, which becomes a destination machine access code address when pasted into the destination field of the Ethernet data frame.

21. The method of claim 20 wherein in step (d) the data set is a destination machine access code address, which becomes a source machine access code address when pasted into the source field of the Ethernet data frame.

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